FIRST ANNUAL REPORT

OF THE

WATER COMMISSIONERS

OF THE

CITY OF LOWELL,

TO THE JOINT STANDING COMMITTEE OF THE
CITY COUNCIL ON WATER WORKS,

Made January 28th, 1871.

LOWELL, MASS.:
STONE & HUSE, BOOK AND JOB PRINTERS, 21 CENTRAL STREET.
1871.

ORGANIZATION:

JOINT STANDING COMMITTEE OF THE CITY COUNCIL ON WATER WORKS.

EDWARD F. SHERMAN, Mayor.

ALBERT A. HAGGETT, Alder.
HENRY P. PERKINS, Pres. C. C.
JEREMIAH CROWLEY, C. C.
WILLIAM DOBBINS, C. C.

BOARD OF WATER COMMISSIONERS.

LEVI SPRAGUE, Chairman,
H. H. WILDER,
WM. E. LIVINGSTON,
ALFRED GILMAN, Clerk.

CONSULTING ENGINEER.

JAMES P. KIRKWOOD, Brooklyn, N. Y.

ENGINEERS.

JOSEPH P. DAVIS, Chief.

GEORGE E. EVANS, Assistant,
JAMES H. HARLOW, Assistant.
C. W. DRAKE,
GEORGE S. RICE,
F. H. SPALDING,
E. S. DAVIS.

WATER COMMISSIONERS' OFFICE,
LOWELL, January 28th, 1871.

GENTLEMEN:

One year since, this Board was chosen by the City Council, for the purpose of carrying into effect the provisions of an Act of the Legislature, passed June 4th, 1869, to introduce water into the City of Lowell, and subject to the regulations and restrictions of "an Ordinance in relation to Water Commissioners and Water Works," passed November, 23d, 1869. This seems a fitting opportunity to review the operations of this Board for the year, and we ask your indulgence in what may seem to be a mere recapitulation of the monthly reports, believing that such a review will show just how the work is situated, and the prospects of its ultimate and successful completion. We would premise that in all undertakings of the importance of this, a certain amount of preliminary work, investigating, surveying and experimenting has to be gone through with, before the actual and manifest labor begins. This is true in the present case, and we are not surprised at the impatience of our constituents, while the first half or more of the year was consumed in finding the best source of supply, in determining the quantities and qualities, in surveying various routes, and experimenting on natural filter, &c. Our own case has proved the reverse of the proverb that "delays are dangerous," as every one is now ready to acknowledge that the time taken for investigation has led to the very best results. The friends of Beaver Brook, of Long, Tyng, and Gumpus Ponds have the satisfaction that their claims

have been thoroughly canvassed, and not condemned without mature and deliberate consideration. The desire to obtain a pure drinking water, so earnestly and repeatedly expressed by many of our citizens, is likely to be gratified.

The first contract which we felt called upon to make was for fifteen hundred tons of iron pipe, the proposals for which were advertised in the two daily papers in this city, and in the Daily Journal in Boston, from May 18th to May 31st; six hundred and fifty tons of straight pipe, and thirteen tons of special castings, to be delivered before the 1st of November, 1870, the remainder between April 1st and July 1st, 1871. This contract was awarded to George H. Norman, of Newport, R. I., whose bid was the lowest of the six bids received.

Amount of contract,		$87,500 00
On this contract there has been paid	$27,058 08	
" " " " " " reserved	4,774 95	
		$31,833 03
Leaving a balance of		$55,666 97

In addition to the above amount paid, there is the sum of $1,999.24 for freight of pipe, inspection at foundry, labor at pipe yard, &c., making a total of $29,057.32. This is no criterion of the average expense per ton, as a large amount of pipe has been received but not yet paid for. Another contract has recently been made with Jesse W. Starr & Sons, of Camden, N. J., for two thousand eight hundred and twenty-four tons of pipe, amounting in the aggregate to $164,658.40.

July 19th, 1870, "Proposals for laying Water Pipe" were issued, and five bids were received. This contract is for laying all the pipe (except one line through Market to Fletcher Streets) in Lowell, north and west of Concord and Merrimack Rivers, leaving Belvidere and Centralville for

another contract. George H. Norman's bid being the lowest the contract was awarded to him,

Amounting to		$100,000 00
On this contract there has been paid,	$6,120 78	
" " " " " " reserved,	1,080 12	
		7,200 90
Leaving a balance of		$92,799 10

To the amount paid must be added for inspection $195.20, making the total, $6,315.98.

Early in August the subject of land for the reservoir claimed our attention. Having located it, we took immediate measures, under the authority of the Ordinance, to gain possession. The Ordinance provides in

"SECTION 5. Whenever the Commissioners aforesaid shall take by purchase or otherwise any land, streams of water, water rights or water sources for the purposes mentioned in said act, they shall, without unnecessary delay, make and deliver to the Mayor of the City of Lowell a certificate signed by them, containing a statement of the fact of such taking, and a description of the lands or water sources so taken, as certain as is required in a common conveyance of land, and a statement of the purposes for which they are so taken, to the end that the Mayor aforesaid may cause such description and statement, signed by him, to be filed in the office of the Registry of Deeds for the Northern District of Middlesex, as required by the second section of said act."

The provisions of this Section were strictly complied with, and a lot of land containing sixteen acres, more or less, was taken. As a general thing, the owners acquiesced in the action of the Commissioners, and we have been enabled to acquire by purchase a large proportion of the lot. Some, however, are unwilling to have us affix a value to their property, and hope to get better terms from the County Commissioners to whom they will have to resort. We have endeavored to manage this delicate business in a spirit of fairness and equity, and with an ardent desire to avoid all litigation.

The following lots have been purchased, and deeds running to the City recorded.

A. S. Langley, for 43,560 feet,.....	$ 475 00
H. B. Proetor, for House, Barn and Land,.....	3,800 00
Luther Richards, for 43,004 feet,.....	600 00
Hugh McEvoy, for 80,680 feet,.....	1,325 00
W. W. & R. L. Read, 73,211 feet,.....	1,371 26
B. Kavanagh, House, Barn and Land,.....	5,500 00
Amounting to.....	$13,071 26

There remains but one lot in the rear of the lots on Beacon Street to purchase, and this lot we have now bargained for with Mr. Lamere, the owner. With the owners of lots facing on Beacon Street, we are desirous to come to an amicable settlement, and have made them what we consider generous offers. Since this land was taken, and the work was commenced on the Reservoir, the necessity of a passage on the southerly side of the Reservoir, not only to accommodate our works, but also to provide a way for the occupants of land in the rear of the Reservoir, became so apparent, that we have taken a strip fifty feet wide fronting on Beacon Street and running back to Christian Street, and have contracted with Messrs. S. Dockham & Co. to build a good and sufficient road.

Having secured the land, we advertised, August 18th, for proposals to build the Distributing Reservoir on Christian Hill. September 2nd, seven bids were received, and Messrs. S. Dockham & Co. being the lowest, the award of the contract was made to them, as follows,

Amount of contract.....		$83,539.25
On this eontraet there has been paid,.....	$6,922.38	
" " " " " " reserved,.....	1,221.60	
		8,143.98
Leaving a balanee of.....		$75,395.27

To the amount paid should be added the sum of $274.67 for moving house and barn, giving a total of $7,197.05.

At the commencement of the work on the Reservoir, appropriate notice of the event was taken by the attendance of the City Government and the Commissioners. It is gratifying to us to be able to state that the work performed on this contract, so far, is satisfactory to us.

August 13th, the plan of the Boston Machine Company, for Hydrants, was adopted by us, and arrangements made with that Company for a supply. The amount paid on this account is $2,850.

At the same date arrangements were made with the Lowell Machine Shop for Valves. The amount paid on this account is $1,660.

August 31st, arrangements were made with Messrs. Cole & Nichols, of Lowell, to furnish the Cast Iron Frames and Covers for Hydrants, and Stop Cock Boxes. The amount paid on this account is $877.09.

Making the amount paid out for these three accounts....	$5,387 09
To which add for freight.....	26 21
A total of.....	$5,413 30

September 2nd, we advertised in our city papers for proposals to build a conduit from Merrimack River, above the dam in Dracut, to the Settling Basins on the west side of Beaver Brook. This Conduit required the construction of a tunnel, in rock, about eight hundred and fifty feet long. September 10th, four bids were received for this contract, and the bid of G. H. Norman, being the lowest, was accepted.

We had, in the previous July, recommended to the City Council a plan of works contemplating the building of settling basins in connection with filter beds, for the purification of the water. This plan, modified by the omission of the filter beds, was adopted.

After the contract for the Conduit had been awarded, our attention was directed to the capacity that should be given to these settling basins, and to the best method of construction. After a careful consideration of the matter, the conclusion was reached, that, if the settling basins alone were to be relied upon for the removal of the matter held in suspension, a very much increased capacity above that required for simply preparing the water for the filter beds should be given to them.

This led in turn to a change in the method of construction. For purposes of economy, it was deemed necessary to substitute sloped embankments in place of the heavy retaining walls required by the original plans. But upon further investigation it was ascertained that the material upon the proposed site of the basins was not of a character to make safe and tight embankments, and that in consequence, the cheapest method of construction that could be devised and would be secure, required the outlay of a considerably larger amount of money than had been estimated as the cost of the smaller basins.

These considerations, together with that of its care and management after construction, were anxiously weighed, and when the attention of the public had been called to the necessity of having *pure water* through the medium of a Natural Filter Gallery, and the Council sanctioned and authorized that plan, we felt that our duty was relieved of a burthen and very much simplified. The settlement of these incidental questions may have led to a slight delay of the work on the Tunnel and the Conduit, but we trust it will not materially affect their construction or completion.

Mr. Norman's contract amounted to		$160,000 00
On it there has been paid	$11,604 63	
" " " " " reserved	2,017 87	
		13,622 50
Leaving a balance of		$146,377 50

From what has been paid on this account, the charge for bricks and cement, $170, should be deducted, and to it should be added the amount paid for inspection, $144.36, making the actual amount paid $11,578.99.

We anticipate the operations for the present year (1871) will be quite extensive. This will appear upon reference to the accompanying estimates of the Chief Engineer. A large proportion of the work will be laid out for completion and payment.

Annexed will be found details of the expenditures of the year just closed under appropriate heads. There are accounts not included in these now given, of amounts charged from other appropriations, as follows:

From Schools, for Book-Case,	$13 92	
" School-Houses	37 24	
" Public Buildings, Labor	87 19	
		$138 35

We see no good reason why a bill for work performed, or material furnished by any department of the city, should not be furnished to the Water Department monthly. This would insure an agreement between our accounts and the Auditor's.

Respectfully submitted.

LEVI SPRAGUE,
H. H. WILDER,
WM. E. LIVINGSTON,
Water Commissioners.

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EXPENDITURES FOR THE YEAR 1870.

SALARIES.

Levi Sprague.....	$1,855 26	*Brought forward*..	$3,710 52
H. H. Wilder.....	927 63	Franklin Davis, Clerk.	269 59
W. E. Livingston....	927 63	Alfred Gilman, Clerk.	289 68
Carried forward..	$3,710 52	Total.....	$4,269 79

ENGINEERS.

J. P. Davis, Engineer.	$3,241 12	*Brought forward*..	$7,722 47
Geo. E. Evans, Ass't..	1,368 50	John Quin.....	15 38
James H. Harlow....	1,134 62	Wm. Smith.....	3 50
Charles W. Drake....	769 23	Jas. P. Kirkwood, C. E.	1,500 00
Edmund S. Davis....	504 00	Geo. S. Rice.....	375 00
Edward K. Perley....	106 00	D. Perham, Board....	38 88
Fitz Henry Spalding.	504 00	*Horse, Carriage and Harness.....	562 00
D. P. Farmer.....	15 00	J. E. Conant, boarding Horse.....	75 75
Mr. Mills.....	2 00	G. S. Butters, use of Horse.....	270 00
C. W. Taylor.....	9 00	D. G. Leavitt.....	7 50
D. W. Howe.....	8 00	Samuel Convers.....	2 25
Geo. H. Gould.....	34 00		
John Le Bard.....	15 00		
James Howley.....	12 00		
Carried forward..	$7,722 47	Total.....	$10,572 73

PRELIMINARY SURVEYS, EXPERIMENTS, WELL IN CENTRALVILLE.

John Cahill.....	$ 26 63	*Brought forward*..	$109 52
Wm. Cahill.....	22 13	Daniel McClary.....	33 37
John Fife.....	15 75	Ed. McKernan.....	37 12
Patrick Gaffney.....	14 63	Patrick O'Brien.....	2 25
Dennis Hunt.....	9 38	Francis Smith.....	9 00
Daniel Leary.....	21 00	Geo. S. Mowe.....	17 50
Carried forward..	$109 52	*Carried forward*..	$208 76

*This account is credited with horse sold, $250.

Brought forward.	$208 76	*Brought forward.*	$1,512 18
James Jordan	3 00	Nichols & Fletcher	16 72
Boat Hire	6 30	J. P. Davis	8 86
William Sullivan	550 00	John Butcher	22 27
M. McDermott	5 25	C. B. Coburn & Co.	21 42
Dennis Hanlin	5 25	J. B. Fielding & Co.	99
W. H. Hickey	28 50	Josiah Gates & Sons.	1 87
M. Fleming	30 37	Hunt, Twitchell & Co.	320 62
Louis Loutard	23 62	W. E. Livingston	30 00
Joel Patnaud	22 12	Lowell Machine Shop.	6 77
James P. Roberts	28 00	Norcross & Saunders.	5 70
Charles F. Riley	15 00	H. & A. Whitney	27 52
A. C. Lawrence	11 00	H. H. Wilder & Co.	1 28
L. Sprague	29 62	John H. Burns	8 50
L. K. Sprague	4 00	Boston & Lowell R. R.	5 00
H. R. Barker	323 01	Fire Department	6 00
Hinckley, Bros. & Co.	3 50	Wm. Kittredge	21 29
E. R. Pierce	101 00	J. Leavitt	3 17
Geo. W. Pearsons	99 13	Daniel Gage	69 00
Fielding & Bartlett	14 75	T. Wilson	20 00
Carried forward.	$1,512 18	Total	$2,109 16

WELL IN DRACUT.

Wm. Bunker	$ 12 00	*Brought forward.*	$262 50
John McCarty	61 25	William Carroll	35 62
Alexis Adams	58 12	A. L. Brooks	20 06
Walter A. Hicky	11 81	G. W. Pearsons	101 71
Dennis Sullivan	29 16	Robert Park	258 36
William Hart	39 17	A. W. Bailey	11 50
T. Lynch	13 87	John Pettingell	3 31
John Harrington	23 62	W. E. Livingston	35 00
Michael Fleming	1 50	Ed. McKernan	4 50
Michael Bolan	12 00	Total	$732 56
Carried forward.	$262 50		

ENGINEERING EXPENSE.

Richard W. Baker	$ 40 00	*Brought forward.*	$151 60
H. C. Church	1 19	F. W. Lincoln	28 00
J. P. Davis	12 29	Jacob Rogers & Co.	21 07
Fielding & Bartlett	12 88	William Kelley	12 00
J. B. Fielding & Co.	85 24	H. H. Wilder & Co.	3 60
Carried forward.	$151 60	*Carried forward.*	$216 27

Brought forward..	$216	27	*Brought forward..*	$367	05
John Butcher.....	13	68	Levi Sprague.....	34	92
Joshua Merrill & Son.	57	46	George W. Pearson....	5	23
Samuel Convers.....	51	00	John Corner.....	1	00
Clough & Boynton...	4	50	Howes & Burnham...	2	52
Daniel Gage.....	7	10	Conant & Co.....	37	75
George E. Evans.....	6	04	Stone & Huse.....	16	50
H. R. Barker.....	7	75	Fiske & Spaulding...	42	85
Brown & Carter.....	3	25			
			Total.....	$507	82
Carried forward..	$367	05			

OFFICE EXPENSES, INCLUDING FURNITURE, RENT AND STATIONERY.

Adams & North....	$241	03	*Brought forward..*	$703	77
Boston & Lowell R. R.		90	H. O. Morse.....	9	50
F. P. Coggeshall.....	17	00	D. G. Leavitt.....	5	00
French & Puffer.....	7	25	Jacob Rogers & Co...	1	68
Griffin & Stevens....	3	78	Richardson & Cutter.	1	50
Nichols & Fletcher...	3	41	W. E. Livingston....	22	20
Paterson & Lavender.	32	00	Carleton & Hovey....	1	00
B. C. Sargent.....	31	80	T. Costello & Co.....	45	21
H. H. Wilder & Co...	8	57	Fielding & Bartlett..	7	88
G. T. Williams	19	00	H. C. & J. F. Howe..	104	68
J. A. Goodwin, P. M..	28	92	George W. Norris....	3	00
Thomas Groom & Co.	5	00	Chase, Sargent & Shattuck.....		30
T. H. Curtis.....	1	25	J. H. McAlvin.....	1	20
Joshua Merrill & Son.	50	15	M. C. Pratt.....	3	44
H. R. Barker.....	25	77	A. J. Simpson & Co..	12	50
Gas Company.....	2	24	Jefferson Bancroft....	10	00
Proprietors Carleton Block.....	212	35	Merchants' National Bank.....	75	00
L. Sprague.....	31	35			
Carried forward..	$703	77	Total.....	$1,007	86

PRINTING, ETC.

Brown & Chase.....	$ 26	75	*Brought forward..*	$429	25
B. H. Penhallow.....	2	00	Marden & Rowell....	$ 56	00
Stone & Huse.....	320	25	Bacheller, Dumas & Co.....	4	50
Boston Journal.....	24	00	Boston Advertiser...	80	75
Knapp & Morey.....	56	25			
Carried forward..	$429	25	Total.....	$570	50

TRAVELLING EXPENSES OF COMMISSIONERS AND ENGINEER.

Levi Sprague.....	$574 68	*Brought forward*..	$584 08
J. P. Davis.....	9 40	H. H. Wilder.....	4 00
Carried forward..	$584 08	Total,.....	$588 08

MISCELLANEOUS.

H. R. Barker.....	$ 3 75	*Brought forward*..	$249 73
J. B. Fielding & Co....	10 62	Joseph S. Conant.....	10 00
Fielding & Bartlett....	1 83	N. C. Sanborn.....	40 00
H. O. Morse.....	8 00	C. H. Allen.....	4 60
Jacob Rogers & Co....	1 44	Norcross & Saunders.	23 50
Jonathan Kendall.....	5 45	American Bank Note Co.....	1,590 00
J. H. McAlvin.....	28 64	J. P, Folsom.....	8 37
Fairbanks, Brown & Co.	190 00		
Carried forward..	$249 73	Total.....	$1,926 20

TOTAL EXPENDITURES FOR 1870.

PAID ON CONSTRUCTION ACCOUNT.

Iron Pipe.....	$29,057 32	
Laying Pipe.....	6,315 98	
Reservoir.....	7,197 05	
Hydrants, Valves, Frames and Covers.....	5,413 30	
Conduit.....	11,578 99	
		$59,562 64
Land.....		13,071 26
Salaries.....	$4,269 79	
Engineers,.....	10,572 73	
Engineering expenses....	507 82	
Office expenses, Furniture, Rent, Stationery, etc.,.....	1,007 86	
Printing and Advertising.....	570 50	
Travelling expenses.....	588 08	
		17,516 78
Amount carried forward.....		$90,150 68

Amount brought forward		$90,150 68
Preliminary Surveys, Experiments, Wells in Centralville,	2,109 16	
Wells in Dracut	732 56	
		2,841 72
Miscellaneous, Scales, Bonds, etc.,		1,926 20
Add charges from other Appropriations		138 35
		95,056 95
Deduct for Freight on Pipe	$792 86	
" " Horse sold	250 00	
		1,041 86
		$94,014 09

ESTIMATES OF FUNDS REQUIRED FOR THE YEAR 1871.

	ESTIMATES.	AMOUNT PAID.	AMOUNT TO PAY.
Galleries	$ 95,000		$ 95,000 00
Connection with River	12,000		12,000 00
Brick Conduit	120,000	$11,578 99	108,421 01
Iron Conduit	80,000		80,000 00
Engine Foundations and Clear Well	10,000		10,000 00
Engine Buildings	35,000		35,000 00
Engine	50,000		50,000 00
Force Main	30,000		30,000 00
Reservoir	65,000	6,922 38	58,077 62
Pipe Distribution	400,000	38,787 31	361,212 69
Land Damages	40,000	13,071 26	26,928 74
Superintendence	30,000	10,572 73	19,427 27
Salaries	5,000		5,000 00
Office Expenses	1,000		1,000 00
			$892,067 33